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Amendment speed of water infiltration in surge irrigation for cinnamon forest soil

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Abstract. Surge irrigation by furrows has been the subject of much research, and the results consistently demonstrate its numerous benefits over continuous watering. The benefits include a shorter time for the water to reach the furrow end, much better irrigation water uniformity, less irrigation water loss due to deep filtration and flow, and many more. For three years, researchers have been conducting studies in the "Chelopechene" experimental field. There is a distance of 150 meters and a furrow slope of 1%. There are eight furrows that have been detected. Constant values have been shown, and it has been shown that the second phase of the water flow takes less time to reach a given furrow section while increasing the time to drain the rear head of the water. Infiltration rates are getting close to the constant value of water filtration via soil.

Keywords: surge irrigation, soil, infiltration, parameters

Introduction

In most circumstances, surge irrigation furrows have benefits over continuous ones, according to a plethora of research conducted during the last 20 years. The benefits of well-planned and managed furrow irrigation systems include faster water flow, more consistent irrigation rates along the furrows, less surface runoff, and improved water quality (Bichop et al., 1982; Ismail, 2004; Podmore et al., 1983). The soil layer 0-100 cm accounted for 21.8% of the leached smolnitsa in our country's previous surveys (Gospodinov, 2009; Gospodinov et al., 2009). The length of the furrows was 150 m, and their slope was 1%. A total of eight furrows were noted. A 10-minute and a 20-minute cycle time variation were also tested. Through the time of accomplishment and drain to a specific length of the furrow, one may indirectly assess the change in the pace of water penetration into soil throughout the various phases of this process. When these periods equalized at each successive surge, it signifies that the infiltration rate had reached its maximum, which is the rate at which water may infiltrate the specified soil.

Results and discussion

In their 1985 study, Bautista and Wallender failed to detect any impact of surgeIrrigation on sandy medium clay (clay loam) soils takes a particular amount of time to reach certain distances. The following tables detail the results of an investigation of the soil's water filtration law during surge movement in both wet and dry beds conducted by Izuno and Podmore (1985) along the water furrow: 25, 50, 75, 100, 125, and 150 m. Method of water submittal in Table 1. According to the findings, a full cycle of data pulses—10 minutes in the first and 20 minutes in the second—is enough to cause a significant change. Wet the bed of the furrows for the duration of its filtration rate; 50 m along the from changes in speed to infiltration rate to constant furrow is shown using 10-minute pulses. A steady value has been maintained during the three stages of infiltration. Larger distances from the first wetting pulse result in the following: initially dry soil, significantly shorter transit time due to the first wetting pulse, and, after 2-3 pulses, the furrow is soaked and the soil is moist. Wetting begins with fixed values.

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The rate of infiltration into furrows is the same as that of continuous watering. Following the first secondary surgee, which had previously moistened during the first surgee, the time required for thewetting pulse is significantly decreased in 20-minute pulses according to the same norm. Taken into account in the second and subsequent rows. Prior to reaching a constant value, the "transit" third pulse takes precedence over this topic. The time-infiltrative function has constant values. The third surge in a row changes the "wet" and "transit" modes of infiltration, demonstrating that the pace of infiltration approaches the constant speed of the "dry" mode.transpiration from the ground.
The research set out to quantify the rate of change.Soils watered with surge on Cinnamon forest soils show time drainage and water contact along the furrows with pulse irrigation (10- and 20-minute pulses), gently bringing it closer to the constant pace of water filtering.Citron soil and water flow only in a moist bed (the so-called second phase of water movement) are shown. There was a steady rise in the duration of drainage after the first three or four pulses.

Material and methods

The experiments were carried out on the cinnamonic forestsoils in field station “Chelopechene” . The maximal field capacity of values for the respective distances along the furrows. With
increasing distances along the furrow drainage times increases andthe curve connecting the values has a convex form.
The curve showing time for the water front to reach the

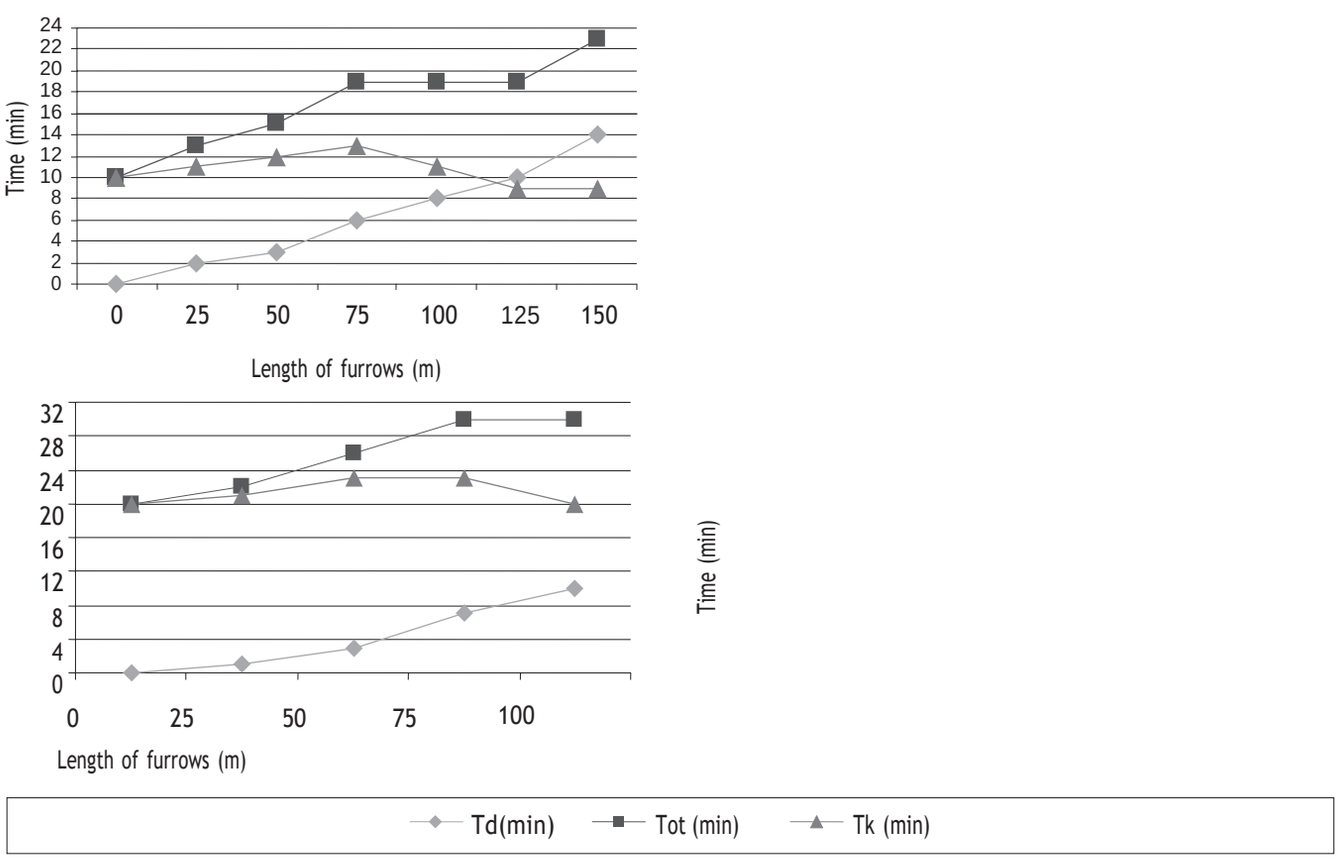

Figure 1. Time to achieve, and drainage of watercontact along the furrows -surge irrigation (after 13 surge - 10 min).Water movement in furrowwetted

Figure 2. Time to achieve, and drainage of water contact along the furrows - surge irrigation (after 6 surge - 20 min).Water movement in furrow wetted

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type. Reducing the time in the second phase of the movement of water in the furrows to reach constant values corresponding to constant speed of filtration of water in the soil, combined with the increasing value of time to reach the rear drainage leads to reach the end of furrows, increasing the time of contact with ground increased contact time of water in the soil along the furrows and is the basis of the advantages of pulse irrigation to continuous one. (Figures 1 and 2). These advantages consist of reducing the time to

a more uniform distribution of watering rates, water running along furrows, Humphreys AA, Bichop AA, and Walker WA, 1982. Power and actual irrigation rate achievement close to ideal criteria decreases water conservation by surge flow. minimize irrigation erosion in Joseph, MI by preventing water loss via deep filtration and runoff (ASAE Paper 82-2101, St.).Since 2004 (Ismail SM). Irrigation efficiency using surge flow in Egypt. Optimizing water use for agricultural output. A dissertation submitted to Wageningen University and approved by its academic boards

Conclusion

Applying surge irrigation to Cinnamon forest soils after the first pulse, during the second phase of water movement in furrows (wet bed movement), alters the most crucial aspects of the irrigation process. The time it takes to reach is now very near its permanent value for the furrow's length, having been drastically decreased. With values that are almost constant, the time to drain is on the rise. The rate of infiltration is almost identical to the constant rate of water filtration in soil.

Referances

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